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Claims

[c1] 1. A method for decomposing a linear program comprising:

relaxing material balance and sourcing constraints of said linear program based on stocking point criteria;
initially solving the linear program with relaxed material balance and sourcing constraints to produce an initial solution;
replacing variables in said linear program with constants based on said initial solution;
restoring said material balance and sourcing constraints; and
finally solving the linear program using said constants and with all constraints in place to obtain a complete solution of said linear program.

[c2] 2. The method in claim 1, further comprising, before initially solving said linear program, decomposing said linear program into smaller independent linear programs, wherein said process of initially solving said linear program solves said smaller independent linear programs simultaneously in parallel.

[c3] 3. The method in claim 1, further comprising selecting

material balance and sourcing constraints that are associated with the least complex parts within bills-of-materials used by said linear program as said relaxed material balance and sourcing constraints.

[c4] 4. The method in claim 1, further comprising selecting material balance and sourcing constraints that are associated with parts that have supply availability and lack capacity constraints as said relaxed material balance and sourcing constraints.

[c5] 5. The method in claim 1, further comprising selecting material balance and sourcing constraints that are associated with parts that are available during the planning horizon of said linear program as said relaxed material balance and sourcing constraints.

[c6] 6. The method in claim 5, wherein said planning horizon includes an initial planning horizon, shipping lead time, and manufacturing cycle time.

[c7] 7. The method in claim 1, wherein said stocking point criteria relates to time dependent stocking points comprising part numbers, locations of parts identified by said part numbers, and the time periods when said parts will be available.

[c8] 8. A method for solving a linear program having con-

straints in a production planning system, said method comprising:

determining which of said constraints can be temporarily relaxed;

relaxing selected constraints of said linear program based on said determining process;

decomposing said linear program into smaller independent linear programs;

initially solving said smaller independent linear program with relaxed constraints to produce an initial solution;

replacing variables in said linear program with constants based on said initial solution;

restoring said material balance and sourcing constraints; and

finally solving said linear program using said constants and with all constraints in place to obtain a complete solution of said linear program.

[c9] 9. The method in claim 8, wherein said process of initially solving said smaller independent linear programs solves said smaller independent linear programs simultaneously in parallel.

[c10] 10. The method in claim 8, wherein said determining process identifies constraints that are associated with the least complex parts within bills-of-materials used by

said linear program as said constraints that can be temporarily relaxed.

[c11] 11. The method in claim 8, wherein said determining process identifies constraints that are associated with parts that have supply availability and lack capacity constraints as said constraints that can be temporarily relaxed.

[c12] 12. The method in claim 8, wherein said determining process identifies constraints that are associated with parts that are available during the planning horizon of said linear program as said constraints that can be temporarily relaxed.

[c13] 13. The method in claim 12, wherein said planning horizon includes an initial planning horizon, shipping lead time, and manufacturing cycle time.

[c14] 14. The method in claim 8, wherein said determining process is based on stocking point criteria.

[c15] 15. A method for solving a linear program having constraints in a production planning system, said method comprising:

determining which of said constraints can be temporarily relaxed based on stocking point criteria that relates to time dependent stocking points comprising

part numbers, locations of parts identified by said part numbers, and the time periods when said parts will be available;

relaxing selected constraints of said linear program based on said determining process;

decomposing said linear program into smaller independent linear programs;

initially solving said smaller independent linear program with relaxed constraints to produce an initial solution;

replacing variables in said linear program with constants based on said initial solution;

restoring said material balance and sourcing constraints; and

finally solving the linear program using said constants and with all constraints in place to obtain a complete solution of said linear program.

[c16] 16. The method in claim 15, wherein said process of initially solving said smaller independent linear programs solves said smaller independent linear programs simultaneously in parallel.

[c17] 17. The method in claim 15, wherein said determining process identifies constraints that are associated with the least complex parts within bills-of-materials used by said linear program as said constraints that can be tem-

porarily relaxed.

[c18] 18. The method in claim 15, wherein said determining process identifies constraints that are associated with parts that have supply availability and lack capacity constraints as said constraints that can be temporarily relaxed.

[c19] 19. The method in claim 15, wherein said determining process identifies constraints that are associated with parts that are available during the planning horizon of said linear program as said constraints that can be temporarily relaxed.

[c20] 20. The method in claim 19, wherein said planning horizon includes an initial planning horizon, shipping lead time, and manufacturing cycle time.

[c21] 21. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform a method for solving a linear program having constraints in a production planning system, said method comprising:

determining which of said constraints can be temporarily relaxed;

relaxing selected constraints of said linear program based on said determining process;

decomposing said linear program into smaller independent linear programs;

initially solving said smaller independent linear program with relaxed constraints to produce an initial solution;

replacing variables in said linear program with constants based on said initial solution;

restoring said material balance and sourcing constraints; and

finally solving said linear program using said constants and with all constraints in place to obtain a complete solution of said linear program.